

REMARKS

Further and favorable reconsideration is respectfully requested in view of the foregoing amendments and following remarks.

Claim Status and Amendments

Claims 1-11 and 13-15 were pending when last examined.

Claim 6 was withdrawn as being directed to non-elected subject matter.

Claims 1-5, 7-11 and 13-15 were examined and stand rejected.

Claim 1 has been amended to recite that the interfacial polycondensation reaction is performed in the absence of an amine compound, a quarternary ammonium salt compound and a quarternary phosphonium salt compound as a polymerization catalyst. Support for this amendment can be found in the specification as filed, for example, page 8, line 34 to page 9, line 8.

Further, claim 1 has been amended to incorporate the limitations of claim 2, as a result of which claim 2 has been cancelled, without prejudice or disclaimer.

Claims 1, 4, 8 and 11 have been amended to make editorial changes, in order to better comply with U.S. practice.

All amendments are made without acquiescence to the correctness of the Office's position, and are merely to expedite allowance of the application.

No new matter has been added.

Consideration After Final Rejection

Although this Amendment is presented after final rejection, the Examiner is respectfully requested to enter the amendments and consider the remarks, as they place the application in condition for allowance.

Rejection Under 35 U.S.C. § 112, First Paragraph

On pages 2 and 3 of the Office Action, claims 1-5, 7-11 and 13-15 are rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. Specifically, the Examiner contends that the specification supports the recitation of "substantial absence", but not for the complete absence of the three types of compounds. Further, the

Examiner contends that the specification does not teach a substantial absence of all amine compounds, quarternary ammonium salt compounds and quarternary phosphonium salt compounds when such compounds are not used as polymerization catalysts.

Applicants respectfully traverse this rejection.

Initially, the specification as filed does support the recitation of “the absence of an amine compound, a quarternary ammonium salt compound and a quarternary phosphonium salt compound.” Specifically, the specification discloses that it is most preferred to “carry out the polymerization in a state where the polymerization catalyst is neither added nor present in the reaction system.” See page 9, lines 24-29 of the specification as filed.

Additionally, the polymerizations in the Examples of the specification are carried out in the absence of a polymerization catalyst.

Lastly, claim 1 has been amended to recite that the interfacial polycondensation reaction is performed in the absence of an amine compound, a quarternary ammonium salt compound and a quarternary phosphonium salt compound as a polymerization catalyst.

In view of the foregoing, Applicants respectfully assert that the subject matter of Applicants’ claims, specifically the absence of the three recited types of compounds as a polymerization catalyst, is fully supported by the specification as filed. Accordingly, this rejection is untenable and should be withdrawn.

Rejections Under 35 U.S.C. § 103(a)

(A) On pages 3-7 of the Office Action, claims 1-5, 7-8 and 14-15 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Suzuki et al. (EP 11421954) as evidenced by Hughes (US 3,575,852).

The Position of the Examiner

The Examiner takes the position that Suzuki et al. teaches a process for the production of a resin composition comprising 100 parts by weight of a polycarbonate and 0.1 to 50 parts by weight of a silicate filler. The Examiner contends that Suzuki et al. teach that the silicate filler is prepared by introducing an organosilicon compound containing a hydrolysable group or hydroxyl group bonded to a silicon atom in a lamellar silicate. The Examiner further asserts that, in the method of making the resin composition, the method of polymerization is not specifically

limited, and that interfacial polycondensation may be used when other polymers are used. (Emphasis added.) The Examiner admits that Suzuki et al. fail to teach using interfacial polycondensation to make the resin composition with the phyllosilicate when an aromatic polycarbonate is used as the resin. However, the Examiner asserts that since the reference is open to any method, it would have been obvious to one skilled in the art to use interfacial polycondensation to make the resin composition.

Applicants' Arguments

Applicants respectfully traverse this rejection.

(1) Absence of a polymerization catalyst

Suzuki et al. discloses a process for producing a resin composition comprising a polycarbonate and a silicate filler. However, Suzuki et al. does not teach or suggest a method of making a resin composition wherein the polymerization for a polycarbonate occurs in the absence of an amine compound, a quaternary ammonium salt compound, and a quaternary phosphonium salt compound as a polymerization catalyst. This limitation is clearly required by Applicants' claims, and is an important aspect of the claimed method.

Specifically, Applicants' method is characterized by carrying out the polycondensation reaction in the absence of a polymerization catalyst, in order to avoid the lamellar silicate from becoming lipophilic. See page 8, line 6 to page 9, line 34 of the specification. When present, the polymerization catalyst easily enters the interlayer spaces of the lamellar silicate to undergo ion exchange, thus causing the lamellar silicate to become lipophilic. The result is that an aqueous phase can no longer exist in the interlayer spaces, and the lamellar silicate can no longer be taken into the polycarbonate chain.

In Applicants' claimed process, where the polycondensation occurs in the absence of the polymerization catalyst, the polymerization easily occurs in the interlayer aqueous phase of the lamellar silicate, thus allowing the lamellar silicate to be taken into the polycarbonate, and resulting in a resin composition with high elasticity.

Suzuki et al. fails to teach or suggest reacting a polymer precursor of Component A (an aromatic polycarbonate) by means of an interfacial polycondensation reaction in the presence of Component B (a silicate filler), and in the absence of a polymerization catalyst. Further, Suzuki

et al. fails to teach or suggest the unexpected advantages achieved by Applicants' claimed process.

(2) The importance of the aqueous phase

As discussed above, the absence of the polymerization catalyst during the polycondensation reaction is vital, due to the importance of the aqueous phase. Specifically, the presence of the polymerization catalyst causes the lamellar silicate to become lipophilic, thus eliminating the aqueous phase. This is unacceptable, because the reaction for generating a polycarbonate takes place in the interlayer aqueous phase of the lamellar silicate. The lamellar silicate is taken into the polycarbonate, and the resulting composition has high elasticity. See page 10, lines 9-13 of the specification.

Suzuki et al. fails to recognize the importance of the aqueous phase. In fact, although Suzuki et al. mentions interfacial polycondensation, as admitted by the Examiner, the reference does not teach or suggest interfacial polycondensation when an aromatic polycarbonate is used. On the contrary, the reference clearly teaches that "[f]or the polymerization of polycarbonate resin, [a] transesterification method is preferably used...". Please see paragraph [0121] of Suzuki et al. Thus, one skilled in the art, when reading the disclosure of Suzuki et al., would understand that different methods for polymerization may be employed, depending upon the components to be used. However, one skilled in the art would certainly look to the clear teaching of the reference that transesterification method is to be used when polymerizing polycarbonate. In transesterification, the polymerization is carried out in melt, and no aqueous phase is present.

Thus, Suzuki et al. fails to teach or suggest (1) interfacial polycondensation of an aromatic polycarbonate, (2) in the absence of a polymerization catalyst, (3) wherein the presence of the aqueous phase is important, (4) to achieve the unexpected and superior result of high elasticity.

(3) Unexpected and superior results shown in specification

Applicants kindly direct the Examiner's attention to the Examples and Comparative Examples of the specification. Specifically, Example 1, where the interfacial polycondensation occurred in the absence of a polymerization catalyst, had far superior storage elastic modulus when compared to Comparative Example 1, wherein a polymerization catalyst was present. Please see Tables 1 and 2 on pages 66-67 of the specification.

(4) Hughes used only as evidentiary reference

Suzuki et al. fails to teach or suggest Applicants' claimed process, as discussed above.

Hughes discloses a process for removing dissolved phosphates from water, and is thus irrelevant (non-analogous) to Applicants' invention. Further, Hughes is relied upon by the Examiner only as an evidentiary reference, and thus does not remedy the deficiencies of Suzuki et al.

In view of the foregoing, it is evident that the subject matter of Applicants' claims is patentable over Suzuki et al., as evidenced by Hughes. Thus, it is respectfully requested that this rejection be withdrawn.

(B) On pages 7 and 8 of the Office Action, claims 9, 10, 12 and 13 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Suzuki et al. as evidenced by Hughes, and further in view of Kricheldorf (Handbook of Polymer Synthesis).

The Position of the Examiner

The Examiner admits that Suzuki et al. fails to teach that the interfacial polycondensation is carried out in an emulsified state. The Examiner relies on Kricheldorf, stating that the reference teaches that it is known to perform interfacial polycondensation in an emulsified state.

Further, regarding claim 10, the Examiner states that if one of ordinary skill was going to perform the interfacial polycondensation in an emulsified state, it would have been obvious to have applied shear force to the mixture to create an emulsion.

Applicants' Arguments

Applicants respectfully traverse this rejection.

Suzuki et al. fails to teach or suggest interfacial polycondensation that is performed in an emulsified state without causing substantial shear force. Applicants' claim 9 requires the interfacial polycondensation to be carried out in an emulsified state. Applicants' claim 10 requires interfacial polycondensation that is performed in an emulsified state without substantially causing shear force. See page 40, line 5-26. Applicants assert that before the present invention, it was widely thought that the action of shear force was required for uniformly dispersing a lamellar silicate in a polycarbonate resin. However, Applicants have discovered that in the interfacial polycondensation in the presence of Component B for forming a polycarbonate,

an excellent emulsified state, which is once generated, is rather maintained without substantially causing the shear force to act. The polycarbonate resin composition produced by the claimed method, which has excellent elasticity compared to conventional polycarbonate resin compositions containing lamellar silicate, is an unexpected and inventive discovery.

Additionally, claim 1 is patentable over Suzuki et al. as evidenced by Hughes, for the reasons discussed previously. Since claims 9, 10 and 13 depend direct or indirectly upon claim 1, these claims are also patentable over Suzuki et al. as evidenced by Hughes.

Furthermore, the teachings of Kricheldorf fail to remedy the deficiencies of Suzuki et al. as evidenced by Hughes. Kricheldorf discloses a reaction of diamine and diacid chloride, and is thus irrelevant to the present invention.

In view of the foregoing, it is evident that the subject matter of Applicants' claims is patentable over Suzuki et al., as evidenced by Hughes, and in view of Kricheldorf. Thus, it is respectfully requested that this rejection be withdrawn.

(C) Finally, on page 9 of the Office Action, claim 11 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Suzuki et al., Hughes, and Kricheldorf, and further in view of Mitsunaga et al. (WO 2003/010235 with US Publication No. 2004/0030021 as an English language equivalent).

The Position of the Examiner

The Examiner admits that Suzuki et al. fail to teach the step of adding a monohydric phenol. The Examiner relies on Mitsunaga et al., stating that the reference teaches that a terminal capping agent is generally used in interfacial polycondensation polymerization to make aromatic polycarbonates to which silicates will be added.

Applicants' Arguments

Applicants respectfully traverse this rejection.

Initially, claim 10 is patentable over Suzuki et al. as evidenced by Hughes, in view of Kricheldorf for the reasons discussed previously. Since claim 11 depends directly upon claim 10, claim 11 is also patentable over this combination of references.

Mitsunaga et al. fails to remedy the deficiencies of the above references. In fact, Mitsunaga et al. teaches away from the current invention because it teaches the use of a tertiary amine, quaternary ammonium compound or quaternary phosphonium compound to promote the polymerization reaction. See paragraphs [0046] and [0050] of US '021. Therefore, a person having ordinary skill in the art would not be motivated to carry out the polymerization reaction in the absence of a polymerization catalyst as required by Applicants' claims.

In view of the foregoing, it is evident that the subject matter of Applicants' claims is patentable over Suzuki et al., as evidenced by Hughes, and in view of Kricheldorf and Mitsunaga et al. Thus, it is respectfully requested that this rejection be withdrawn.

CONCLUSION

Therefore, in view of the foregoing amendments and remarks, it is submitted that each of the grounds of rejection set forth by the Examiner has been overcome, and that the application is in condition for allowance. Such allowance is solicited.

If, after reviewing this Amendment, the Examiner feels there are any issues remaining which must be resolved before the application can be passed to issue, the Examiner is respectfully requested to contact the undersigned by telephone in order to resolve such issues.

Respectfully submitted,

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